U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Ostodes strigatus*

COMMON NAME: Sisi

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status
___ New candidate
_X__ Continuing candidate
___ Non-petitioned
_X__ Petitioned - Date petition received: May 11, 2004
__ 90-day positive - FR date:
_X_ 12-month warranted but precluded - FR date: May 11, 2005
_N_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

_N__ Listing priority change
Former LP: ___
New LP: ___

Date when the species first became a Candidate (as currently defined): November 15, 1994
___ Candidate removal: Former LPN: ___
___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or

continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails; Family Poteriidae (snail)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: American Samoa (island of Tutuila)

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: American Samoa (island of Tutuila)

LAND OWNERSHIP Land ownership in American Samoa generally follows a historic village tradition. Large sections of land around each village are controlled by that village for the use by the village residents. The Maloata population of the sisi snail is within the bounds of Maloata Village.

LEAD REGION CONTACT: Linda Belluomini, (503) 231-6283, linda_belluomini@fws.gov

LEAD FIELD OFFICE CONTACT: Pacific Islands Fish & Wildlife Office, Christa Russell (808) 792-9400, christa_russell@fws.gov

BIOLOGICAL INFORMATION

Species Description

Ostodes strigatus is a snail in the superfamily Cycclophoroidea and the family Poteriidae (= Neocyclotidae) (Cowie 1998; Vaught 1989). It has a white depressed conical shell with distinctive parallel ridges and a multispiral operculum (Abbott 1989). The sisi snail is a ground-dwelling snail that feeds on decaying leaf litter and fungus (Girardi 1978). It is likely that adults deposit eggs into leaf litter where they develop and hatch.

Taxonomy

The sisi snail is a member of the family Poteriidae, which occurs through tropical Central and South America. The genera *Ostodes* and *Gassiesia* are confined to the islands of the South Pacific. All members of the family are ground-dwelling snails (Girardi 1978; Abbott 1989). Girardi (1978) and Cowie (1998) are the most recent and accepted taxonomic work for this species.

Habitat/Life History

The sisi snail is found on the ground in rocky areas at lower elevations. The vegetation is characterized by a relatively closed canopy with light understory plant coverage. While these areas (below 500 feet (ft) (152 meters (m) elevation) receive moderate to high rainfall, they are more open and drier than the wet forests found at higher elevation or along the northern sections of coastline (Miller 1993).

Historical Range/Distribution
The sisi has only been known from the island of Tutuila, American Samoa (Miller 1993).

Current Range/Distribution
During a survey of snails in American Samoa (Miller 1993), fewer than 50 live snails were seen; all of these were in Maloata Valley (121-400 ft (37-122 m) elevation) on the western end of the island of Tutuila, American Samoa. The snails were found to be highly scattered in the leaf litter on the forest floor under an intact canopy of 32 to 49 ft (10-15 m) above the ground. Several live predatory snails, *Euglandina rosea*, were found in the same area, and the ground was littered with the shells of dead *Ostodes strigatus*. Shells of dead sisi snails were found at 4 of the 8 survey sites in Maloata Valley including the site with live sisi snails.

Population Estimates/Status
Fewer than 50 live snails were seen in Maloata Valley.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.
The declines of the native snails in American Samoa have resulted, in part, from significant loss of native habitat to forestry and agriculture, loss of native forest structure to hurricanes, and the establishment of alien weeds after these storms. These threats may interact to greatly exacerbate the loss of populations and species. All live sisi snails have been found in the leaf litter beneath remaining intact forest canopy. No snails were found in areas bordering agricultural plots or in forest areas that were severely damaged by three hurricanes (1987, 1990, and 1991) (Miller 1993). Under natural historic conditions, loss of forest canopy to storms did not pose a great threat to the long term survival of these snails; enough intact forest with healthy populations of snails would support dispersal back into newly regrown canopy forest. However, the presence of alien weeds such as *Mikania micrantha* (mile-a-minute vine) may reduce the likelihood that native forest will re-establish in areas damaged by the hurricanes (Whistler 1992). This loss of habitat to storms is greatly exacerbated by an expanding agriculture needed to support one of the world's highest human population growth rates (Craig *et al*. 1993). Agricultural plots have spread from low elevation up to middle and some high elevations on Tutuila, greatly reducing the forest area and thus reducing the resilience of native forests and their populations of native snails. These reductions also increase the likelihood that future storms will lead to the extinction of populations or species that rely on the remaining canopy forest.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
None known.

C. Disease or predation.

At present, the major existing threat to long-term survival of the native snail fauna in American Samoa is predation by the alien rosy carnivore snail *Euglandina rosea*, the most commonly recommended biological control agent of the giant African snail (*Achatina fulica)*. Numerous studies show that the rosy carnivore snail feeds on endemic island snails and is a major agent in their declines and extinctions (van der Schalie 1969; Hart 1978; Hadfield and Mountain 1981; Howarth 1983, 1985, 1991; Clarke *et al*. 1984; Pointier and Blanc 1984; Hadfield 1986; Murray *et al*. 1988; Hadfield *et al*. 1989, 1993; Kinzie 1992; Cowie 2001).

In an effort to eradicate the giant African snail, the rosy carnivore snail and another alien predatory snail, *Gonaxis kibweziensis*, were introduced in 1980 and 1977, respectively (Eldredge 1988). The rosy carnivore snail has spread throughout the main island of Tutuila and has also spread to the island of Tau (Eldredge 1988). *Gonaxis kibweziensis* is present only on Tutuila and seems to be in decline (Eldredge 1988). Several live rosy carnivore snails were found in the same type of habitat in which the sisi occurs in and the ground was littered with the shells of dead sisi (Miller 1993).

The rosy carnivore snail is also a host to the rat lung worm, a parasite (Mead 1961; van der Schalie 1969). It is not known if the parasite can be maintained in populations of native snails or if a parasite load would have negative effects on snail reproduction.

In addition, a likely threat to the sisi snail is the high probability of the spread of the predatory Manokwar flatworm, *Platydemus manokwari*, into areas occupied by the sisi snail. The Manokwar flatworm has contributed to the decline of native tree snails, due to its ability to ascend into trees and bushes that support native snails. Areas with populations of the flatworm usually lack partulid tree snails or have declining numbers of snails (Hopper and Smith 1992). The predatory flatworm currently occurs on Tutuila, however it has not been confirmed to occur in areas occupied by the sisi snail (U. Tulafono, Director, Department of Marine Wildlife Resources, American Samoa, pers. comm. 2006).

D. <u>The inadequacy of existing regulatory mechanisms</u>.
Currently, no formal or informal protection is given to the sisi by the Federal or American Samoa governments or by private individuals or groups.

E. <u>Other natural or manmade factors affecting its continued existence</u>.
Even if the threats responsible for the decline of this species were controlled, the persistence of existing populations is hampered by the small number of extant populations and the small geographic range of the known populations. This circumstance makes the species more vulnerable to extinction due to a variety of natural processes. Small populations are particularly vulnerable to reduced reproductive vigor caused by inbreeding depression, and they may suffer a loss of genetic variability over time due to random genetic drift, resulting in decreased evolutionary potential and ability to cope with environmental change (Lande 1988; Pimm *et al*. 1988; Center for Conservation Update 1994; Mangel and Tier 1994). Random environmental events, like severe storms, can affect the continued existence of the sisi snail due to the small numbers of populations and individuals that remain.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

We are unaware of any planned or implemented conservation measures being conducted for the sisi.

SUMMARY OF THREATS

Based on our evaluation of habitat degradation and loss and the effects of predation we conclude there is sufficient information to develop a proposed rule for this species due to the threat of habitat destruction or modification by agriculture, forestry, and nonnative invasive weeds, and the threat of predation by the rosy carnivore snail. In addition, the spread of the predatory Manokwar flatworm, is a likely threat to the sisi. Random environmental events such as severe storms and typhoons, potentially threaten this snail due to its limited distribution and small number of individuals. We find that this species is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

___Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

- Conduct extensive surveys for sisi
- Develop and implement nonnative snail removal and control program
- Confirm presence of nonnative predatory flatworm in areas occupied by sisi and develop and implement nonnative flatworm control program
- Conduct habitat restoration

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2***
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude:
The threats to the sisi snail from habitat destruction and modification by forestry and agricultural use and invasive nonnative plants, and by predation from nonnative predatory snails are of high magnitude. These threats occur rangewide. The small number of individuals and the small number of populations also make this species very susceptible to the negative effects of randomly occurring natural events such as typhoons and storms. In addition, this species is likely threatened by the Manokwar flatworm.

Immediacy of Threats:
The primary threats to this species from habitat degradation and loss from forestry and agricultural use and invasive nonnative plants, and predation by nonnative predatory snails are imminent because they are ongoing occur throughout the range of the species.

Rationale for Change in Listing Priority Number (insert if appropriate)

___ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Is Emergency Listing Warranted?
No. The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of *Ostodes strigatus* as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

DESCRIPTION OF MONITORING
We conducted literature searches for recent articles on this species and contacted relevant species experts, including University of Hawaii researchers regarding the current status of this species. No additional information on the species' status was found. However, the existing data regarding the species' status was verified.

This level of monitoring is appropriate to update the status of the species because a thorough literature search was conducted as well as relevant species experts contacted. Information contained in this assessment form was verified and any updated information incorporated.

List of Experts Contacted:

Name	Date	Affiliation
Robert Cowie	February 1, 2010	University of Hawaii
Ray Tulafono	January 29, 2010	American Samoa Dept. of Marine & Wildlife Resources

The sisi is included as a species of concern in American Samoa's comprehensive wildlife conservation strategy (Department of Marine and Wildlife Resources, American Samoa Government 2006).

COORDINATION WITH STATES

On January 29, 2010, we sent a letter to the American Samoa Department of Marine and Wildlife Resources requesting their review and comment on our most recent candidate assessment of this species. No response was received.

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Personal Communications

Tulafono, U.R. Director, American Samoa Department of Marine and Wildlife Resources. Faxed letter regarding the Department's response to candidate assessment forms, September 5, 2006.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:

Acting Carolyn A. Bohan 5/18/10
Regional Director, Region 1, Fish and Wildlife Service Date

Rowan W Gould
ACTING
Director, Fish and Wildlife Service October 22, 2010

Concur:

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 13, 2010
Conducted by: Lorena Wada, Pacific Islands FWO
Biologist, Prelisting and Listing Program

Comments:
PIFWO Review

Reviewed by: Christa Russell Date: April 23, 2010
Prelisting and Listing Program Coordinator

Marilet Zablan Date: April 26, 2010
Assistant Field Supervisor, Endangered Species Division

Gina Shultz Date: April 30, 2010
Acting Field Supervisor